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George V. Voinovich, Governor
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Donald R. Schregardus, Director

FILE: _____
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April 20, 1999

RE: DOE FEMP
COMMENTS IN SITU
PACKAGE FOR
CERTIFICATION

Mr. Johnny Reising
U.S. Department of Energy, Fernald Area Office
P.O. Box 538705
Cincinnati, OH 45253-8705

Dear Mr. Reising:

This letter provides Ohio Environmental Protection Agency comments on the "Revised real time in situ gamma spectroscopy reports and documentation to support the use of high purity germanium detectors to perform final soil certification for primary radionuclides" Package. This Package was transmitted to Ohio EPA in your letter DOE-0356-99. This letter also serves to provide a summary of conclusions and path forward that were agreed to at the April 13, 1999 meeting of DOE-FN, DOE-EML, Fluor-Daniel Fernald, USEPA and contractors, Ohio Department of Health and Ohio EPA.

The above-referenced Package was submitted to formalize DOE's proposal to use high purity germanium detectors (HPGe) for final certification. It is current practice to use in situ gamma spectroscopy methods for 100% scans of areas prior to the collection of discrete physical samples used for laboratory analysis. (In the jargon used in Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), the 100% scan is the "survey" and the discrete samples are "confirmatory".) In actuality, in situ methods are used for certification in the "survey" phase of the analysis. Furthermore, knowing that a 100% scan would be performed prior to discrete sampling was an important factor in determining the number of discrete samples, the certification unit sizes, and the statistical confidence intervals that would be required. In the language of MARSSIM, the FEMP is surveying with the RTRAK and HPGe and confirming with discrete laboratory samples.

The Ohio Environmental Protection Agency has been participating in strategies for developing and deploying in situ gamma spectroscopy for over two years. We have endorsed the deployment of in situ methods for hot spot identification, remediation control, pre-certification scans, and to bias samples collected from soil columns. In the case of hand-held friskers, we have supported in situ methods for determining levels of PPE. We would like to encourage DOE

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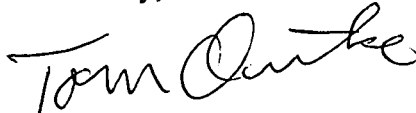
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to continue to develop technologies to scan soil cores and to support excavation control in the bottoms and sides of deep trenches. It is our intention to support those efforts and to participate in their implementation.

If you have any questions, please contact Tom Ontko or me.

Sincerely,



For Thomas A. Schneider
Fernald Project Manager
Office of Federal Facilities Oversight

cc: Jim Saric, U.S. EPA
Terry Hagen, FDF
Mark Shupe, HSI GeoTrans
Francie Hodge, Tetra Tech EM Inc.
Ruth Vandergrift, ODH
Manager, TPSS, DERR, CO

**Ohio Environmental Protection Agency comments on the "Revised real time
in situ gamma spectroscopy reports and documentation to support the use of
high purity germanium detectors to perform final soil certification for
primary radionuclides" Package**

General comment

- 1) Commenting Organization: Ohio EPA Commentor: ODH
 Section #: Pg #: Line #: Code: general
 Comment: A support document, the In-Situ Gamma Addendum to the Sitewide CERCLA QAPP asserts under criterion 9 that management assessment of the of the real-time program shall occur annually in accordance with a plan. There is no mention of what this plan is. Is the addendum itself the plan?

Comparability of In-Situ Gamma Spectrometry and Laboratory Data, Rev 1

- 2) Commenting Organization: Ohio EPA Commentor: ODH
 Section #: Pg #: Line #: Code: general
 Comment: The revised In-Situ Spectroscopy Reports support the conclusion that HPGe detectors provide overall comparable decisions as discrete samples relative to soil certification decisions for primary radionuclides in certain areas at the FEMP. Thus far this has been demonstrated for "routine" geometries and locations from which the data was generated. Additional data should also be collected from areas characteristic of the entire suite of extreme topographic conditions likely to be encountered once excavation commences in the production area.
- 3) Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: General Comment Pg #: na Line #: na Code: C
 Comment: The use of HPGe for certification appears to require numerous input parameters such as soil moisture, radon concentration, and knowledge of the contaminant mix (heterogenous vs. homogenous, etc), FCS measurements before and after sampling, etc. How many samples can be performed per day, and at what total cost as compared to taking physical samples? What is the cumulative effect of all the additional parameters on the measurement result?
- 4) Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: General Comment Pg #: na Line #: na Code: C
 Comment: The entire comparison has been performed using wet weight rather than dry weight, as is required for certification. The comparison between field moisture content and laboratory soil moisture content appear as if moisture content will add as much uncertainty to the measurement as any other factor.
- 5) Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 2.1.1 Pg #: 2-1 Line #: 25-26 Code: C

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Comment: The text states that measurements were taken twice daily ... "unless...other work priorities interfered". The QA/QC should require that an a.m. and p.m. measurement be conducted whenever the HPGe is used.

- 6) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.1.1 Pg #: 2-2 Line #: 1-2 Code: C
Comment: The 20% downtime for any instrument appears high. How will this availability affect the implementation of HPGe in the field and what are the causes for the downtime. Reviewing the report, one gets the impression that the instruments worked without any problems.
- 7) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.2 Pg #: 2-3 Line #: 22-25 Code: C
Comment: What is the effect of soil moisture on measurement results? Please provide equation. The differences in measured moisture content are disturbing.
- 8) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.2 Pg #: 2-4 Line #: 1-2 Code: C
Comment: During control measurement activity, is there any data showing as to whether that particular instrument was subsequently used in the field all day and then checked again? Also, is there a record of weather conditions in the field during instrument usage, including humidity?
- 9) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Figure 2-2C Pg #: na Line #: na Code: C
Comment: Temperature appears to have a larger affect than reported. An extended analysis should be performed comparing measurements taken at less than 60 degrees F, and greater than 60 degrees F. Also, what is the manufacturer's recommended operating temperatures.
- 10) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Figure 2-3C Pg #: na Line #: na Code: C
Comment: There is a slight decreasing trend of total U vs. humidity, but this trend is not evident in Th-232 vs humidity, why?
- 11) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Figure 2-3C Pg #: na Line #: na Code: C
Comment: During this test, were the instruments used all day in the field between a.m. and p.m. measurements, or were the instruments used just for two readings. The instrument should have been used all day to identify any problems with electronics etc, from continued exposure to elevated humidity.

The document should state that where the correction factor has been applied, there is evidence that the correction factor may be applicable to the site.

- 20) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 8.0 Pg #: General Comment Line #: na. Code: C
Comment: A comparison between FEMP HPGe and DOE EML HPGe is of limited value due to the extensive consulting provided by DOE EML to FEMP during the development of FEMP HPGe program.
- 21) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 8.2.2 Pg #: 8-2 Line #: 20-24 Code: C
Comment: The text states that Wilcoxon Signed Ranks Test indicating bias between DOE EML data and FEMP data, but, offers no explanation for possible biases. Please provide explanation.
- 22) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 8.3 Pg #: 8-3 Line #: 19-24 Code: C
Comment: This entire paragraph should be deleted. The conclusion that R.T. Reiman's results and EML's results are representative of what the FEMP would have measured is pure conjecture. FEMP should have participated.
- 23) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 8.3 Pg #: 8-3 Line #: 4-5 Code: C
Comment: Earlier in the text, it was stated that FEMP no longer uses EGAS software, but, here it states that FEMP uses it. This is inconsistent.
- 24) Commenting Organization: Ohio EPA Commentor: ODH
Section #: Pg #: G-2 Line #: Code:
Comment: The nuclide library lists the 1001.0 keV gamma as originating from Th-234. This appears to be a typo as this gamma is emitted from Pa-234m.

Comparability of In Situ Gamma Spectroscopy and Laboratory Data and Decisions for Certification Units, Rev 0

The Ohio EPA has no comments.

RTRAK Applicability Study, Rev 2

- 25) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1.2 Pg #: 1-3 Line #: 1-3 Code: C

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- 12) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Figure 2-4C Pg #:na Line #:na Code: C
Comment: The figure appears to indicate that measurements taken during colder weather biases the results low.
- 13) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Figure 2-5C Pg #: na Line #: na Code: C
Comment: A map indicating the location of the FCS relative to any onsite radiation sources should be included. Plotting radon concentrations with the Ra results would be beneficial.
- 14) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.2.1 Pg #: 3.1 Line #: 27-28 Code: C
Comment: The locations are listed as PBC-1 through PBC-10 and PBC-12 through PBC-19. Is there no location PBC-11?
- 15) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Table 3-5 Pg #: na Line #: na Code: C
Comment: The difference between the Troxler measurement s and laboratory measurement for soil moisture content appear to vary substantially. During implementation in the field how will these differences be addressed?
- 16) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.4 Pg #: 4-5 Line #: 27-32 Code: C
Comment: A comparison between dry weights should also be done. The reporting concentration for certification is in dry weight.
- 17) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 5.1 Pg #: 5-1 Line #: 19-21 Code: C
Comment: Why was weighting factor for laboratory gamma spectrometry changed?
- 18) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 7.6.2 Pg #: 7-10,11 Line #: na Code: C
Comment: These correction algorithms have been developed by specifically fitting the data. Are there any supporting theoretical equations that support/justify this algorithm?
- 19) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 7.6.2 Pg #: 7-12 Line #: 7-9 Code: C
Comment: The limited application of the correction algorithm and presence of the K65 silos at the FEMP suggest that the correction for Ra-226 may not be applicable to the entire FEMP site.

The document should state that where the correction factor has been applied, there is evidence that the correction factor may be applicable to the site.

- 20) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 8.0 Pg #: General Comment Line #: na Code: C
Comment: A comparison between FEMP HPGe and DOE EML HPGe is of limited value due to the extensive consulting provided by DOE EML to FEMP during the development of FEMP HPGe program.
- 21) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 8.2.2 Pg #: 8-2 Line #: 20-24 Code: C
Comment: The text states that Wilcoxon Signed Ranks Test indicating bias between DOE EML data and FEMP data, but, offers no explanation for possible biases. Please provide explanation.
- 22) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 8.3 Pg #: 8-3 Line #: 19-24 Code: C
Comment: This entire paragraph should be deleted. The conclusion that R.T. Reiman's results and EML's results are representative of what the FEMP would have measured is pure conjecture. FEMP should have participated.
- 23) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 8.3 Pg #: 8-3 Line #: 4-5 Code: C
Comment: Earlier in the text, it was stated that FEMP no longer uses EGAS software, but, here it states that FEMP uses it. This is inconsistent.
- 24) Commenting Organization: Ohio EPA Commentor: ODH
Section #: Pg #: G-2 Line #: Code:
Comment: The nuclide library lists the 1001.0 keV gamma as originating from Th-234. This appears to be a typo as this gamma is emitted from Pa-234m.

Comparability of In Situ Gamma Spectroscopy and Laboratory Data and Decisions for Certification Units, Rev 0

The Ohio EPA has no comments.

RTRAK Applicability Study, Rev 2

- 25) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1.2 Pg #: 1-3 Line #: 1-3 Code: C

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Comment: The GPS may be able to display the speed at which the operator of the RSS is walking, aiding in the consistency of measurements.

- 26) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1.4 Pg #: 1-4 Line #: 18 Code: C
Comment: In this section and throughout the document the total uranium measurements are based on "normally" enriched uranium. OEPA assumes this to mean "natural" abundances of the uranium isotopes. Are there any checks or guidelines to ensure this assumption is true, especially when surveys are performed in the former production area.
- 27) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.2 Pg #: General Line #: General Code: C
Comment: The calibration of the RTRAK is based on static measurements from the HPGe and the RTRAK. These detectors have different fields of view. How is this accounted for in the calibration process.
- 28) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.3 Pg #: 2-6 Line #: 11-14 Code: C
Comment: This paragraph states that 1 mph/ 4 sec acquisition time might be the optimal operating conditions for the RTRAK. Besides the logistical considerations, how was this proven to be the best speed/acquisition time for the RTRACK?
- 29) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.1 Pg #: 3-1 Line #: 1-9 Code: C
Comment: This paragraph should explicitly define the ranges for the detections of contaminated soils. The depths and areal extent of contamination which can be detected utilizing the RTRACK.
- 30) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.3 Pg #: 3-2 Line #: Code: C
Comment: What are the accuracy limits of the GPS, and how would inexact locations affect the efficiency calibration of the RTRACK?
- 31) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.3 Pg #: 3-3 Line #: 24 Code: C
Comment: This equation implies that the efficiency for measuring Th-232 is in the range of 6%. This efficiency is not clearly carried into MDC calculations. Provide information on how efficiency is used in the MDC calculations.

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- 32) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4 Pg #: Table 4-12 Line #: na Code: C
Comment: The table should include the area over which the measurement is aggregated as well as the minimal detectable "hot spot" area and concentration.
- 33) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 6.0 Pg #: 6-4 Line #: 4-5 Code: E
Comment: This sentence does not make sense as written, believe it should read, "The current calibration equations provide good agreement with HPGe except at low uranium concentrations".

Data Validation Check List for HPGe at ASL Level D, Draft

- 34) Commenting Organization: Ohio EPA Commentor: ODH
Section #: 5.7 Pg #: Line #: Code: c
Comment: A field control station located north of the STP has been used as part of the QC program for both the RTRAK and HPGe. What provisions are in place to replace this locale and its function upon remediation of the former area?

Updated Section 2.5 (Rev B) of User's Manual, entitled "Certification"

The Ohio EPA has no comments on this.

Updated Section 3.7 (Rev B) of User's Manual, entitled "Certification Measurements"

- 35) Commenting Organization: Ohio EPA Commentor: ODH
Section #: 3.7.5 Pg #: Line #: Code: c
Comment: HPGe certification decisions for radium-226 appear equivalent to lab data provided radon-222 disequilibrium in soil and accumulation near the ground surface are compensated for as needed. The process for conducting these particular measurements and data review guidance from this section of the User's manual make this process seem difficult to implement efficiently from a field operations viewpoint.

Crosswalk between USEPA comments on Comparability Study documents
Crosswalk between USEPA comments on RTRAK Applicability Study

The Ohio EPA has no comments on these two submittals.